

CLAIMS

What is claimed is:

1. A plant comprising at least one recombinant DNA molecule comprising an embryo specific promoter operably linked to at least a portion of at least one coding sequence for a plant fructosyltransferase, operably linked to a vacuole targeting sequence, said molecule sufficient to express a protein capable of producing fructan having a degree of polymerization of at least three, in an embryo of said plant, or any progeny thereof, wherein said progeny comprise said molecule.
2. The plant of Claim 1 wherein said fructan is inulin.
3. The plant of Claim 1 wherein said fructosyltransferase is selected from the group consisting of sucrose:sucrose fructosyltransferase, and the combination of sucrose:sucrose fructosyltransferase and fructose:fructose fructosyltransferase.
4. The plant of Claim 1 wherein said plant is a cereal.
5. The plant of Claim 1 wherein said plant is corn.
6. The plant of Claim 1 wherein said plant is soybean.
7. The plant of Claim 1 wherein said coding sequence for fructosyltransferase is selected from the group consisting of a monocot and a dicot.
8. The plant of Claim 1 wherein said at least one fructosyltransferase comprises a sucrose:sucrose fructosyltransferase.
9. The plant of Claim 1 wherein said at least one fructosyltransferase comprises a first fructosyltransferase and a second fructosyltransferase, wherein said first fructosyltransferase comprises sucrose:sucrose fructosyltransferase and said second fructosyltransferase comprises fructose:fructose fructosyltransferase.
10. The plant of Claim 1 wherein said at least one DNA molecule comprises a first DNA molecule and a second DNA molecule, said first DNA molecule comprises sucrose:sucrose fructosyltransferase and said second DNA molecule comprises fructose:fructose fructosyltransferase.
11. The plant of Claim 1 wherein said at least one DNA molecule comprises sucrose:sucrose fructosyltransferase and fructose:fructose fructosyltransferase.
12. Fructan produced by the enzyme encoded by the coding sequence in the recombinant DNA molecule from the plant of Claim 1.
13. A recombinant DNA molecule comprising an embryo specific promoter operably linked to at least a portion of at least one coding sequence for a fructosyltransferase, operably linked to a vacuole targeting sequence, said molecule sufficient to express a protein capable of producing fructan in an embryo cell.
14. The recombinant DNA molecule of Claim 13 wherein said fructan is inulin.

15. The recombinant DNA molecule of Claim 13 wherein said fructosyltransferase is selected from the group consisting of sucrose:sucrose fructosyltransferase, and the combination of sucrose:sucrose fructosyltransferase and fructose:fructose fructosyltransferase.

5 16. A method of producing fructan in a plant comprising:

- a) constructing at least one recombinant DNA molecule comprising an embryo specific promoter operably linked to a vacuole targeting sequence operably linked to at least a portion of at least one coding sequence for a fructosyltransferase,
- 10 b) transforming a plant cell with said construct,
- c) regenerating said plant to produce seed,
- d) harvesting seed from said plant of step c, and
- e) extracting fructan from seed of step d.

17. The method according to Claim 16, wherein said fructan is inulin.

15 18. A method of screening transgenic maize tissue expressing embryo targeted genes comprising:

- a) preparing Type-II maize callus for transformation,
- b) transforming callus,
- c) selecting transgenic callus lines,
- 20 d) regenerating transgenic somatic embryos, and
- e) propagating transgenic somatic embryos for both plant production and early trait analyses.

19. A foodstuff comprising fructan obtained from a plant comprising at least one recombinant DNA molecule comprising an embryo specific promoter operably
25 linked to a vacuole targeting sequence operably linked to at least a portion of at least one coding sequence for a fructosyltransferase, said molecule sufficient to express a protein capable of producing fructan of at least DP3 in a grain of said plant, or any progeny thereof, wherein said progeny comprise said molecule.

20. A foodstuff comprising inulin obtained from a plant comprising at least one recombinant DNA molecule comprising an embryo specific promoter operably
30 linked to a vacuole targeting sequence operably linked to at least a portion of at least one coding sequence for a fructosyltransferase, said molecule sufficient to express a protein capable of producing fructan of at least DP3 in a grain of said plant, or any progeny thereof, wherein said progeny comprise said molecule.

35 21. An industrial product comprising fructan obtained from a plant comprising at least one recombinant DNA molecule comprising an embryo specific promoter operably linked to a vacuole targeting sequence operably linked to at least a portion of at least one coding sequence for a fructosyltransferase, said molecule sufficient

to express a protein capable of producing fructan of at least DP3 in a grain of said plant, or any progeny thereof, wherein said progeny comprise said molecule.

22. The industrial product of Claim 21 selected from the group consisting of a hydrocolloid, a bleach activator, a dispersing agent, a glue, and a biodegradable complexing agent.

23. Grain of the plant of Claim 1.

24. Grain of the plant of Claims 5 or 6.

25. A foodstuff comprising grain of the plant of Claim 1.

26. A foodstuff comprising grain of the plant of Claims 5 or 6.